

PATENT
Attorney Docket No. 214764

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Frank H. READ

Art Unit: Unassigned

Corresponding to International
Application No. PCT/GB99/03556

Examiner: Unassigned

Filed: Concurrently

For: **ELECTRICALLY-CHARGED
PARTICLE ENERGY ANALYSERS**

**AMENDMENTS TO THE CLAIMS
MADE VIA PRELIMINARY AMENDMENT**

Please amend claims 7, 10-12, 15, 18, 21, 24-27, 30-32, 34-36, 38-39, 41-42, 44,
46, 48, 50-53, and 56-58 as follows:

7. (Amended) An analyser as claimed in [any one of claims] claim 2 [to 6]
wherein said surface is in a field-free region beyond the electrostatic focusing field.

10. (Amended) An analyser as claimed in [any one of claims] claim 1 [to 9]
wherein said equipotentials are symmetrical about said axis.

11. (Amended) An analyser as claimed in [any one of claims] claim 1 [to 10]
wherein said outer field defining means is maintained, in use, at a potential relative to
said inner field defining means.

12. (Amended) An analyser as claimed in [any one of claims] claim 1 [to 11]
wherein said inner field defining means and said outer field defining means comprise an

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inner cylinder and an outer cylinder respectively, wherein said inner cylinder is maintained, in use, at a uniform potential and said outer cylinder is maintained, in use, at potential varying monotonically in the axial direction.

15. (Amended) An analyser as claimed in claim 11 [or claim 12] wherein said outer field defining means comprises a plurality of discrete field defining elements, each said element being maintained, in use, at a different respective potential with respect to said inner field defining means.

18. (Amended) An analyser as claimed in claim 11 [or claim 12] wherein said outer field defining means comprises a plurality of discrete field defining elements each being made from electrically resistive material and being maintained, in use, at a respective potential which increases monotonically in the axial direction.

21. (Amended) An analyser as claimed in [any one of claims] claim 1 [to 20] including first and second end elements located at opposite ends of said inner and outer field defining means in respective planes orthogonal to said axis, each of said first and second end elements being maintained in use at a potential relative to said inner field defining means which varies logarithmically in the radial direction.

24. (Amended) An analyser as claimed in [any one of claims] claim 21 [to 23] wherein charged particles having different energies are brought to a focus by the electrostatic focusing field at different respective discrete positions in the plane of one of said first and second end elements.

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25. (Amended) An analyser as claimed in [any one of claims] claim 1 [to 9]
wherein said electrostatic focusing means is so configured that the distribution of
potential in said electrostatic focusing field is uniform as a function of azimuthal angle
about said axis.

26. (Amended) An analyser as claimed in [any one of claims] claim 1 [to 9]
wherein said electrostatic focusing means is so configured that the distribution of
potential in said electrostatic focusing field has n-fold rotational symmetry about said
axis, where n is an integer.

27. (Amended) An analyser as claimed in claim 11 [or claim 12] wherein
said inner field defining means and/or said outer field defining means has n-fold
rotational symmetry about said axis, where n is an integer.

30. (Amended) An analyser as claimed in [any one of claims] claim 1 [to 27]
wherein said charged particles are brought to a focus at discrete positions spaced apart
from each other along said inner field defining means and said surface of said detection
means is located at and conforms to said inner field defining means to detect the focused
charged particles.

31. (Amended) An analyser as claimed in [any one of claims] claim 1 [to 14]
wherein said charged particles are brought to a focus at said axis and said surface of said
detection means is located on said axis to detect the focused charged particles.

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----- 32. (Amended) An analyser as claimed in [any one of claims] claim 1-[to 31] -----
wherein said charged particle source is located on said axis.

34. (Amended) An analyser as claimed in [any one of claims] claim 1 [to 23]
wherein said charged particle source comprises a target located on said axis and means
for directing radiation onto said target whereby to generate said charged particles, said
target and said means for directing radiation being located within said inner field defining
means.

35. (Amended) An analyser as claimed in claim 33 [or claim 34] wherein
said means for directing radiation is an electron gun.

36. (Amended) An analyser as claimed in [any one of claims] claim 1 [to 35]
wherein said charged particle source directs charged particles into said electrostatic
focusing field over a predetermined angular range in azimuth about said axis.

38. (Amended) An analyser as claimed in [any one of claims] claim 1 [to 35]
wherein said charged particle source directs charged particles into said electrostatic
focusing field over two or more discrete angular ranges in azimuth about said axis.

39. (Amended) An analyser as claimed in [any one of claims] claim 1 [to 11]
wherein said charged particle source directs charged particles into said electrostatic
focusing field over one or more predetermined angular range in azimuth about said axis,

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said charged particles being admitted to the electrostatic focusing field by one or more windows in the inner field defining means.

41. (Amended) An analyser as claimed in [any one of claims] claim 1 [to 35] wherein said charged particle source directs charged particles into said electrostatic focusing field over two or more predetermined angular range in azimuth about said axis, and said detection means is so configured and arranged as to detect charged particles derived from each said angular range.

42. (Amended) An analyser as claimed in [any one of claims] claim 1 [to 41] wherein said detection means comprises one or more detector selected from a multi channel array detector, a microsphere array detector and a position-sensitive resistive plate detector.

44. (Amended) An analyser as claimed in [any one of claims] claim 1 [to 43] including means for adjusting the axial position of said charged particle source.

46. (Amended) An analyser as claimed in [any one of claims] claim 1 [to 45] wherein said charged particle source includes aperture means for directing charged particles into said electrostatic focusing field over a predetermined angular range in elevation relative to said axis.

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56. (Amended) A method for operating a charged-particle energy analyser as claimed in [any one of claims] claim 1 [to 55] comprising the steps of applying voltage to said electrostatic focusing means in order to obtain operation in the first-order focusing mode within a predetermined energy range and scaling the applied voltage in order to obtain operation in the second-order focusing mode at a selected narrower energy range within said predetermined energy range.

57. (Amended) An analyser as claimed in [any one of claims] claim 1 [to 10] wherein said predetermined range in azimuth is the entire (360°) azimuthal range.

58. (Amended) An analyser as claimed in [any one of claims] claim 1 [to 11] wherein said inner and outer field defining means comprises an inner cylindrical segment and an outer cylindrical segment respectively, wherein said inner and outer cylindrical segments extend over a predetermined angular range in azimuth and said outer cylindrical segment is maintained, in use, at a potential varying linearly in the axial direction.